

REMARKS

The amendments to the claims and specification in the present response first appeared in a Response to Office Action mailed May 25, 2004. An Office Action mailed June 8, 2004 indicated that said Response to Office Action was non-compliant because two claims (an independent claim and a dependent claim) were both numbered as claim 89. In response to the Office Action mailed June 8, 2004, the response is revised herein such that the dependent claim 89 has been renumbered to be claim 90. The response is now in compliance and reconsideration is respectfully requested.

Claims 1-83 were previously pending in this application, with claims 33-35 and 78-80 being withdrawn. By this amendment, Applicant is canceling claims 33-35 and 78-80 without prejudice or disclaimer. Claims 32, 76 and 77 have been amended. New claims 84-90 have been added. As a result, claims 1-32, 36-77 and 81-90 are pending for examination with claims 1, 31, 32, 36, 45, 46, 76, 77 and 89 being independent claims. The Applicants respectfully request reconsideration.

Preliminary Matters

The title has been amended to read READER FOR CONDUCTING ASSAYS.

Allowable Subject Matter

Applicants acknowledge that claims 1-30, 36-75 and 81-83 are allowed.

Rejections Under 35 U.S.C. §102

The Office Action rejected claims 76 and 77 under 35 U.S.C. §102(b) as being anticipated by either one of U.S. Patent No. 5,439,647 to Saini (hereinafter Saini) or U.S. Patent No. 5,745,231 to Groger et al. (hereinafter Groger).

The Office Action alleges that Saini discloses an assay device which includes all of the recited features of claims 76 and 77. In particular, the Office Action referred to FIG. 3C of Saini alleging that it discloses an assay device having a light source, plural analyte receiving areas, light redirecting and transmitting means all integrated on a single support.

The Office Action further alleges that Groger discloses an assay device including all of the recited features. In particular, the Office Action refers to FIG. 4 of Groger alleging that it

discloses an assay device having a light source, plural analyte receiving areas, light redirecting and transmitting means all integrated on a single support. The Applicants respond as follows.

Saini discloses a waveguide sensor formed on a chip package (abstract). The waveguide sensor can have one or more waveguide arms (col. 1, line 30 et seq.). Each arm is either a sensing waveguide arm and or a reference waveguide arms (col. 1, line 30 et seq.). A sensing waveguide arm has a “sensing chemistry” to interact with a sample disposed in a sensing arm (col. 2, lines 27-29). Light from a source is reflected from a sloped surface disposed in a sensing arm and projected down the sensing arm (col. 1, lines 21-23). The light interacts with the sensing chemistry in the arm and is detected by a detector to analyze the sample disposed in the arm (col. 2, lines 27, 34). In particular in FIG. 3C, to which the Office Action refers, there are three sensing arms and one reference arm (col. 3, lines 16-21).

Groger discloses a fluorescence sensor for analyzing chemical properties of liquid and gas analytes (col. 1, lines 9-10). The sensor includes a planar optical waveguide and an out-of-plane photodetector. The apparatus is configured such that an evanescent field of the waveguide excites a thin, chemically-sensitive fluorophores film disposed on the waveguide. For example, a photodetector may be located out of the plane of the waveguide by placing the photodetector in a hollow in the substrate on which the waveguide is located (col. 3, lines 55-57) or in a remote location as illustrated in FIGs. 3 and 4 of Groger (col. 3, line 66 to col. 4, line 1).

To detect a chemical using a device as disclosed by Groger, light energy is introduced into an edge of a waveguide, which results in the production of an evanescent field within a fluorophore film disposed on the waveguide. In the presence of a chemical-to-be-detected, the fluorophore film is chemically modified such that fluorescent light is produced by the fluorophore film in response to the evanescent field. The fluorescent light is detected by an output-of-plane detector. In particular, the Office Action refers to FIG. 4, which illustrates a sensor having multiple waveguides 29. Groger discloses such a sensor as being useful in identifying a solvent (col. 4, lines 13-20).

Claims 76 and 77 have been amended to recite a “a first of [a] plurality of means for redirecting light configured to receives light through a first portion of a vessel disposed in [a] means for receiving an analyte vessel and a second of [a] plurality of means for redirecting light configured to receive light through a second portion of the vessel disposed in the [] means for receiving an analyte vessel.”

Claims 76 and 77 are patentable over Groger

Groger does not disclose or suggest “plural means for receiving an analyte vessel, each disposed along an optical path of a portion of said light generated by said light generating means.” In fact, the device disclosed in Groger requires that an analyte come into contact with a sensor disposed on a waveguide. As such, an analyte for use with a device as disclosed in Groger cannot be located in a vessel. Accordingly, Groger does not disclose any means for receiving an analyte vessel.

Further, because Groger does not disclose the use of an analyte vessel. Groger does not disclose or suggest “a first of [a] plurality of means for redirecting light configured to receive light through a first portion of a vessel ... and a second of [a] plurality of means for redirecting light configured to receive light through a second portion of the vessel.”

Therefore, each of claims 76 and 77 are patentable over Groger, and withdrawal of the rejection of claims 76 and 77 over Groger is respectfully requested.

Claims 76 and 77 are patentable over Saini

Saini does not disclose or suggest “a first of [a] plurality of means for redirecting light configured to receive light through a first portion of a vessel ... and a second of [a] plurality of means for redirecting light configured to receive light through a second portion of the vessel.” Instead, each of the embodiments disclosed Saini include a *single* prism covering an entire end of a waveguide arm (which may include a sample). According there is no plurality of apparatus for redirecting light through corresponding portions of a vessel.

Further, FIG. 3C of Saini does not disclose “plural means for receiving an analyte vessel,” as recited in claims 76 and 77. According to §2182 of the MPEP “the application of a prior art reference to a means plus function ... limitation requires that [a] prior art element perform the identical function specified in the claim. However, if a prior art reference teaches identity of function to that specified in a claim, then ... an examiner carries the initial burden of proof for showing that the prior art structure ... is the same as or equivalent to the structure [or] material ... described in the specification which has been identified as corresponding to the claimed means ... function.”

In the present instance, the device as disclosed in FIG. 3C Saini neither performs the same function nor discloses an element that has the same or equivalent structure that described in the specification of the present application. In fact, the structure of FIG. 3C of Saini fails the first prong of the test provided by §2182 of the MPEP. That is, rather than performing the function of “receiving” a vessel, the vessel merely lies on top of a chip 56.

Therefore, each of claims 76 and 77 are patentable over Saini, and withdrawal of the rejection of claims 76 and 77 over Saini is respectfully requested.

Rejections Under 35 U.S.C. §103

The Office Action rejected claims 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,406,547 to Aihara (hereinafter Aihara) in view of U.S. Patent No. 3,882,318 to Mioduski (hereinafter Mioduski).

The Office Action alleges that Aihara discloses an apparatus for chemical analysis, comprising a light source, a plurality of vessels disposed in an optical path of the light source, a plurality of light pathways leading through the sample vessels, and a single detector receiving the transmitted light. The Office Action acknowledges that the device of Aihara differs from the claimed invention in that it does not include a single printed circuit board for receiving and transducing the so received light.

The Office Action further alleges that Mioduski discloses an apparatus for optical analysis and teaches the use of a circuit board for detecting and transducing light from a sample vessel. The Office Action alleges that it would have been obvious to one of ordinary skill in the art to provide the apparatus for Aihara with a printed circuit board because it is a known means of detecting light transmitted through a sample under study, as per the teaching of Mioduski. The Applicants respond as follows.

Aihara discloses a chemical analyzer comprising a turntable that holds a number of cuvettes containing test liquids (abstract). A single panchromatic light source located at a center axis projects light radially onto the cuvettes (abstract). In a first embodiment, as shown in FIG. 3, a first prism 44a and a second prism 44b are located to collect light after it passes through a given cuvette and redirect the light to a single detector 48 located along the center axis. In the first embodiment, the light collected by the prisms is only at a single location along the cuvette.

A second embodiment of Aihara is illustrated in FIG. 11 (col. 9, line 1 et seq.), in which a plurality of detectors 148 are included, each located behind a corresponding cuvette 16. Again, in the second embodiment, light from each cuvette is collected only at a single location along a cuvette. In a third embodiment (col. 10, line 4 et seq.), a light source 225 projects light directly through cuvettes without the use any redirecting devices. In the third embodiment, a plurality of detectors 148 are included, each located behind a corresponding cuvette 16. Again, light from a given cuvette is only collected at a single location along a cuvette.

Mioduski discloses a chemical testing apparatus having a plurality of testing chambers (abstract). Each testing chamber is configured to receive a container having a sample disposed within (abstract). Two radiant energy paths exist between a source and a test chamber, and two detectors are positioned to receive energy from each radiant energy path (abstract). However, the detectors associated with a given cuvette are located on a separate circuit board from the detectors for any other cuvette.

Combination is improper

The Applicants agree with the statement in the Office Action that Aihara does not disclose or suggest a single printed circuit board for receiving and transducing light. However, the Applicants disagree that it would have been obvious to one of ordinary skill in the art to provide the apparatus for Aihara with a printed circuit board. Neither Aihara nor Mioduski teaches or suggests that a device as disclosed in Aihara should be modified to include a printed circuit board. In fact, the printed circuit board as disclosed in Mioduski includes multiple electronic components, which are not disclosed in Aihara. Accordingly, there is no need for a printed circuit board.

Because neither Aihara nor Mioduski provide motivation to modify Aihara in the manner suggested in the Office Action, the combination of Aihara and Mioduski is improper and any rejection based on the combination of Aihara and Mioduski should be withdrawn.

Claim 31 is patentable over the combination of Aihara and Mioduski

Even assuming that the combination of Aihara and Mioduski is proper, which it is not, if Aihara and Mioduski are combined in the manner suggested in the Office Action claim 31 is patentable over the combination. That is, a device as disclosed in Aihara modified to have a

printed circuit board as taught in Mioduski would fail to have “a single printed circuit board including a plurality of light transducers.” As stated above, in the first embodiment disclosed in Aihara only a single detector is present. In the second and third embodiments of Aihara, the detectors are disposed in a circumference around a plurality of cuvettes. Accordingly, it would not be possible to locate multiple detectors on a single printed circuit board in the second and third embodiments of Aihara. Accordingly, claim 31 is patentable over the proposed combination of Aihara and Mioduski, and the rejections of claim 31 should be withdrawn.

Claim 32 is patentable over the combination of Aihara and Mioduski

Even assuming that the combination of Aihara and Mioduski is proper, which it is not, if Aihara and Mioduski are combined in the manner suggested in the Office Action claim 32, as amended, is patentable over the combination. That is, a device as disclosed in Aihara modified to have a printed circuit board as taught in Mioduski would fail to have “a plurality of optical pipes each configured to receive said portion of said light transmitted along a respective of said optical paths through a respective of said plurality of vessel wells and reflect and conduct said received light downward, a first of said plurality of optical pipes configured to receive light through a first portion of a vessel disposed in one of said plurality of vessel wells and a second of said plurality of optical pipes configured to receive light through a second portion of the vessel disposed in the one of said plurality of vessel wells.” Accordingly, claim 32 is patentable over the proposed combination of Aihara and Mioduski, and the rejections of claim 32 should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicants' attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50/2762.

Respectfully submitted,
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